

Response to Office Action of January 23, 2004

Application 10/066,643
Attorney Docket: 042390.P12752**Remarks**

Applicants would like to thank the Examiner for granting an interview on June 3, 2004. Applicants feel that the discussion of the pending claims in light of the patents cited in the Office Action of January 23, 2004, was helpful and Applicants appreciate the Examiner's interest in advancing prosecution in this case.

Claims 1-20 are pending in the application. Of these, claims 8-14 were the subject of a restriction requirement and were nonelected, without traverse. Claims 1-7 and 15-20 were rejected in a non-final Office Action dated January 23, 2004. In that Office Action, Examiner rejected claims 1-7 and 15-20 under 35 U.S.C. § 103(a) in light of Nakaoka, et al. (US-6,583,512 B2) and Burns (US-4,607,779). Also in that Office Action, Examiner required a new title.

A. Remarks on Requirement for Change in Title.

In the Office Action dated January 23, 2004, Examiner required a change in title, stating that "the title of the invention is not descriptive." In accordance with this requirement, Applicants respectfully request that the title of the application be changed to the following:

"Wafer Bonding Using a Flexible Bladder Press and Thinned Wafers for Three-dimensional (3D) Wafer-to-Wafer Vertical Stack Integration, and Applications Thereof."

B. Remarks on Rejections of Claims Under 35 U.S.C. § 103(a).

In the Office Action dated January 23, 2004, Examiner rejected claims 1-7 and 15-20 under 35 U.S.C. § 103(a) in light of Nakaoka, et al. (US-6,583,512 B2, hereinafter "Nakaoka") and Burns (US-4,607,779, hereinafter "Burns"). Applicants traverse these rejections and respectfully request that they be withdrawn.

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The requirements for making a *prima facie* case of obviousness 35 U.S.C. § 103(a) are well established in the law. The Patent Office requires that the Examiner comply by following Section 2143 of the Manual of Patent Examining Procedure. MPEP 2143 requires that the Examiner support such rejections by showing that the cited patents teach all the claim limitations, and by showing how the cited patents make a suggestion to combine them. Applicants respectfully assert that no *prima facie* case of obviousness has been made because the Examiner failed to show a suggestion to combine the patents and failed to show how the proposed combination teaches all the claim limitations, such as "a first wafer" and "a second wafer," and a "flexible bladder press."

B (1). The proposed combination neither teaches nor suggests all claim limitations.

As noted above, Applicants assert that the proposed combination of Nakaoka and Burns fails to meet the rejected claims because it does not teach every element of the claims. Applicants respectfully assert that the combination of a patent for bonding a semiconductor die to a wafer (Nakaoka) with a patent for gang bonding semiconductor dice to a metal lead frame (Burns) fails to render obvious claims which require first and second wafers and a flexible bladder press.

Addressing claim 1, Applicants object to the Examiner's characterization of the cited patents and assert that the purported combination fails to teach each and every element of claim 1. Claim 1 claims, in part, ". . . a three dimensional (3D) integrated chip system comprising **a first wafer** including one or more integrated circuit (IC) devices **and a second wafer** including one or more integrate circuit (IC) devices . . ." Nakaoka does not teach first and second wafers.

Examiner improperly asserts that Nakaoka discloses first and second wafers by stating that element 20 in Nakaoka is a second wafer. However, element 20 is not a wafer, it is a semiconductor chip, and Nakaoka distinguishes a chip 20 from a wafer 36 (see, e.g., Nakaoka, column 12, lines 21-34). Applicants respectfully submit that Applicants' claim limitations relating to bonding a first

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wafer and a second wafer are not met by art which teaches bonding a chip to a wafer. For example, successful bonding depends in part on achieving contact between the surfaces to be bonded. Nakaoka concerns electrically connecting an individual die to a wafer, as is now well known in the art. Nakaoka is not relevant to establishing electrical connections between the surface of a first wafer and a second wafer.

Claim 1 also claims, in part, ". . . a metal bonding layer . . . to provide metal bonding between the first and second wafers, when the first wafer is pressed against the second wafer **using a flexible bladder press** . . ." Examiner turns to and relies upon Burns to supply the flexible bladder press element, yet never points out how that patent meets the claim limitation of a "flexible bladder." Examiner asserts that "figure 4 discloses a wafer using a flexible bladder press (force applied at 25 directed to the various 26s applying pressure to 20 onto the individual IC CHIPS)," apparently suggesting that plate 25 acting through individual pressure plates 26 is a "flexible bladder press." Examiner does not explain how these elements teach a flexible bladder and Applicants respectfully assert that they do not do so. By ignoring the limitation "flexible bladder," examiner has failed to show how Burns shows this element.

In citing Burns, applicants respectfully believe that Examiner has relied on art which does not meet the claim limitation of a "flexible bladder" and cannot be made to do so. Burns relates to gang bonding individual dice to a flexible lead frame using pressure evenly distributed across individual pressure plates. Examiner fails to show that the claim limitation of a "flexible bladder press" is met by such a device.

The proposed combination does not disclose wafer-to-wafer bonding, nor does it disclose a flexible bladder press. For at least these reasons, the proposed combination fails to present a *prima facie* case of obviousness by failing to teach each and every element of claim 1.

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Turning now to independent claim 15, Applicants note that Examiner, in rejecting claim 15, restates verbatim the assertion that Burns discloses a flexible bladder press. Applicants again point out that Examiner does not explain how Burns does so. Burns does not use the term "flexible bladder," and Examiner does not explain how Burns teaches one. By completely ignoring the limitation "flexible bladder," examiner has failed to show how Burns, or the combination of Burns and Nakaoka, teach this element.

The proposed combination does not disclose a flexible bladder press. For at least this reason, the proposed combination fails to present a *prima facie* case of obviousness by failing to teach each and every element of claim 15.

Finally, discussing the dependent claims 2-7 and 16-20, Applicants point out that each dependent claim contains the first and second wafer and flexible bladder press limitations discussed above. As such, Applicants respectfully assert that the proposed combination of Burns and Nakaoka fail to render these claims obvious because, at a minimum, the combination does not teach first and second wafers, nor does it teach a flexible bladder press.

Applicants also respectfully assert that the Examiner failed to demonstrate the presence of each and every element of each dependent claim in the proposed combination of patents. In rejecting all the elements of all eleven dependent claims, Examiner pointed out only one element in one claim (rejection of claim 2, based on copper lines 23 in Nakaoka). Instead of pointing out how the proposed combination of the two patents teaches each and every element of these claims, Examiner merely recited Applicants' claim language. Such a recitation does not demonstrate how the cited patents are relevant and provides no basis for the rejection. As such, Examiner has failed to meet the requirements of law and procedure for establishing a *prima facie* case with regard to the dependent claims.

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B (2). Examiner failed to provide a motivation to combine.

Examiner provided no motivation to combine the Nakaoka and Burns patents. Section 2143 of the MPEP imposes on the Examiner the requirement that the cited patents contain a suggestion or motivation to combine them. Examiner failed to make this showing, and in fact made no attempt to do so. Examiner merely prefaced a listing of the elements of the proposed combination by stating that the claims were rejected "over Nakaoka" "in view of Burns," and "Burns is cited for showing" particular features. Examiner neither attempted nor made a showing of a suggestion or motivation to combine Nakaoka with Burns.

By failing to show a suggestion or motivation to combine Nakaoka and Burns, Examiner failed to establish a *prima facie* case of obviousness under section 103(a).


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In view of the foregoing, it is respectfully asserted that all of the claims pending in this patent application are in condition for allowance, and indication of allowance by the Examiner is respectfully requested. If the Examiner has any questions, Examiner is invited to contact the undersigned at (703) 633-0927. If any fee insufficiency or overpayment is found, please charge the insufficiency or credit the overpayment to Deposit Account 02-2666.

Respectfully submitted,

Dated:

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